

DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN OR RELATING TO A COUNTING DEVICE

(71) We, THE METTOY COMPANY LIMITED a British Company, of 14 Harlestone Road, Northampton, NN5 7AF, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to counting devices.

In accordance with a feature of the invention, there is provided a counting device for counting objects moving along a path past the device, comprising a spring driven rotary disc, an escapement mechanism including an operating member adapted for actuation by the successive passages of an object or objects passing along the path adjacent the device to permit stepwise advance of the disc under the action of its driving spring, wherein the disc carries numerals disposed along a spiral line on the disc, and a shutter member having an aperture is guided for radial movement relative to the disc and co-operates with spirally disposed guide means on the disc, in such a manner that stepwise rotation of the disc is accompanied by stepwise advance of the shutter member radially of the disc to expose successive ones of said numerals through the said aperture.

The device is thus adapted to indicate the number of times the device is passed by an object or objects.

Alternatively or additionally, the device may count passing objects and initiate a signal when a predetermined number of individual counts have been made.

Accordingly, the invention further provides a counting device for counting objects moving along a path past the device, comprising a spring driven rotary disc, an escapement mechanism including a member adapted for actuation by the successive passages of an object or objects along the

path adjacent the device, to permit stepwise advance of the disc under the action of its driving spring, a driven member guided for movement radially of the disc and co-operating with spirally disposed guide means on the disc in such a manner that stepwise rotation of the disc is accompanied by stepwise advance of the driven member radially of the disc, and indicating means actuated in response to arrival of the driven member at a predetermined position of the driven member relative to the disc, to indicate completion of a predetermined number of stepwise movements from a given starting position of the disc.

The preferred form of counting device in accordance with the invention which is described below by way of example, is designed to serve as a lap counter for use with a model racing car system, the device serving to indicate the number of circuits of the track which have been completed and to signal the completion of a preselected number of circuits. However, with appropriate modifications, the device may serve many other purposes.

A counting device in accordance with the invention is described below, with reference to the accompanying drawings in which:

Figure 1 is a plan view of the device with a cover member removed;

Figure 2 is a sectional side elevation of the device, and

Figure 3 is an end view of the device.

The device illustrated comprises a frame 1, the lower part of which is provided with means for attachment to a track for model cars, which travel through the device from right to left. As shown in Figure 3, the attachment means may comprise hook like flanges 30 for engagement with a track section. Supported on the top of the frame are a base plate 2 and a cover 3, these three stationary members being secured together. Accommodated between the base

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plate and the cover are a disc 4 and an escapement wheel 5, which are fast to one another and are rotatable about a central vertical pivot 6. The disc and wheel are urged to rotate clockwise by a helical torsion spring (not shown) which is accommodated within the wheel 5. The periphery of the disc 4 is knurled and projects at two diametrically opposite positions through openings in the wall of the cover, so that the wheel can be turned manually against the action of the spring.

The upper face of the disc 4 is formed with a spiral groove 7 and along the line of this groove it is marked with the numerals 0 to 50. A shutter 8, extending diametrically across the face of the disc and formed with a slot through which the pivot 6 passes, has on its underside a tooth 9 which engages in the groove 7, so that the shutter will be displaced from left to right as the disc rotates clockwise. The shutter is guided for rectilinear movement by ribs 10 on the underside of the cover and ribs 11 on the base plate, the latter engaging the downward end 8a of the shutter. An aperture 12 in the shutter exposes one of the numerals on the disc. These numerals not concealed by the shutter are concealed by the cover 3, which is formed with an aperture of sufficient size to register with the aperture 12, whatever the position of the shutter.

The escapement wheel 5 carries sets of upwardly and downwardly projecting teeth 13 and 14 respectively. An escapement lever 15, mounted to rock about a transverse horizontal pivot 16, carries a pair of teeth 17, 18 adapted to engage respectively with the teeth 13, 14 and is urged to engage tooth 17 with one of the teeth 13 by a spring 19. The lever has an arm 15a which projects upwardly through a slot in the cover to allow manual operation of the escapement mechanism. A flap 20, which projects downwardly into the path of a car travelling through the device, has its upper edge pivotally supported at 21 and carries a projection 22, adapted to engage the lever 15. Thus, each time that a car passes through the device, the flap 20 is lifted, rocking the escapement lever 15 and allowing the wheel 5 and disc 4 to rotate one tooth space, so that the next lower numeral on the disc becomes exposed through the aperture 12 in the shutter.

Secured in an opening in the cover 3 is an upwardly projecting transparent casing 23, which accommodates a signal device. This comprises a stationary plate 24 marked (say) to represent a chequered finishing flag and a masking member which includes a pair of plates 25 covering the faces of plate 24, finger grips 26 projecting through openings 27 in casing 23, and a vertical

rod 28 whose lower end rests on shutter 8. When the disc 4 has been turned into the position in which the numeral 0 is exposed through aperture 12, hole 29 in the shutter and a hole 32 in the disc both register below the lower end of the rod 28, which can pass through the registered holes; the masking device accordingly drops by gravity, exposing the finishing signal on plate 24 and locking the disc against further rotation.

In use, assuming that the signal has been operated as last described, the mask is first raised by means of finger grips 26, thus lifting rod 28 clear of the disc and shutter. The disc is manually rotated counterclockwise until the numeral corresponding to the intended number of laps is exposed through window 12, thus winding up the spring. The movement to the left of the shutter will eventually bring its downturned end 8a into the path of a projection 31 on the disc, thus preventing overwinding. It will be observed that teeth 13 are shaped to permit such counterclockwise rotation of the disc, while preventing rotation in the reverse direction. However, should the disc be turned too far, it can be returned clockwise by operating the arm 15a of the escapement lever the appropriate number of times. The device is now ready to "count down" the laps and each operation of the flap 20 by the passage of a car actuates the escapement lever and allows the disc to rotate one tooth space, such rotation and the movement of the shutter which it causes combining to expose the next numeral through window 12. Finally, as numeral 0 is brought into position for exposure, the holes 29 and 32 come into register below rod 28 and allow the mask to drop, exposing signal 24.

WHAT WE CLAIM IS:—

1. A counting device for counting objects moving along a path past the device, comprising a spring driven rotary disc, an escapement mechanism including an operating member adapted for actuation by the successive passages of an object or objects passing along the path adjacent the device to permit stepwise advance of the disc under the action of its driving spring, wherein the disc carries numerals disposed along a spiral line on the disc and a shutter member having an aperture is guided for radial movement relative to the disc and co-operates with spirally disposed guide means on the disc, in such a manner that stepwise rotation of the disc is accompanied by stepwise advance of the shutter member radially of the disc to expose successive ones of said numerals through the said aperture.

2. A device according to claim 1, where-

in the escapement mechanism comprises a toothed escapement wheel fast with the said disc and an escapement lever mounted for reciprocating movement about a pivot axis and co-operating with the said wheel in such a manner that movement of the lever through its working travel and back will permit one increment of stepwise advance of the wheel, the said lever being operated by reciprocating motion of the operating member.

3. A device according to claim 2, wherein the said escapement lever is also operable manually, independently of the said operating member.

4. A device according to any preceding claim including indicating means operable in response to completion of a predetermined number of stepwise movements of the disc from a given starting position.

5. A device according to claim 4, wherein the indicating means is operated by arrival of the shutter member at a unique position, relative to the disc.

6. A device according to claim 5, wherein the shutter member and the disc are provided with holes which come into register at the said unique position and the indicating means comprises a member positioned opposite the said holes at their point of registration and biased to pass through the holes when they come into register.

7. A device according to claim 6, wherein the said member of the indicating device is biased solely by gravity and normally rests on the shutter member until the said hole in that member comes into line with the member of the indicating means.

8. A device according to any one of

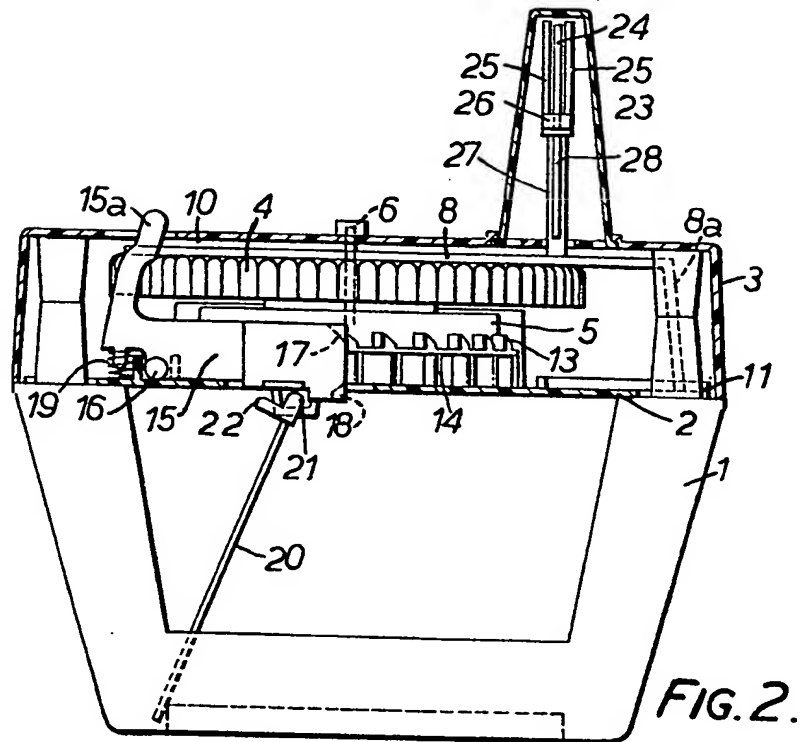
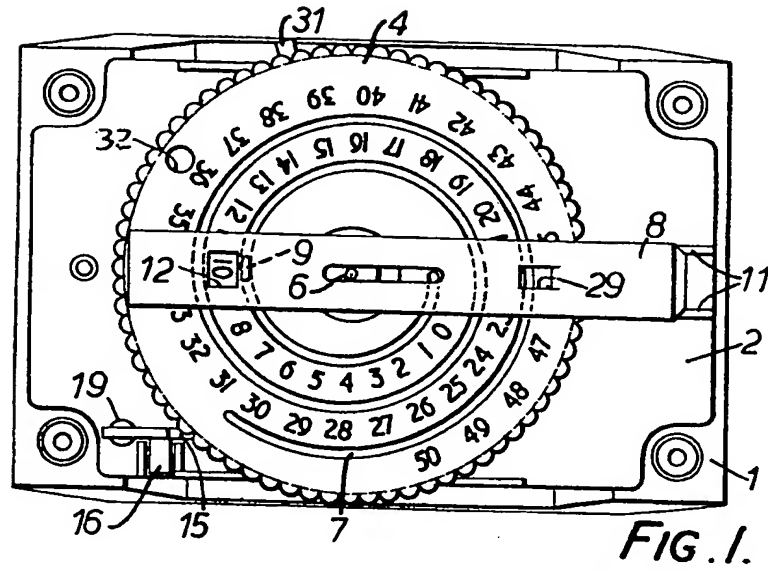
claims 4 to 7, wherein the indicating means is a flag indicator.

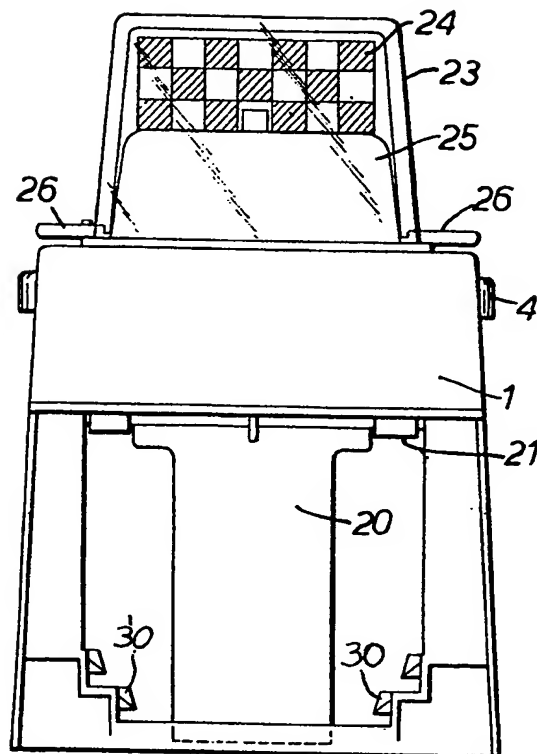
9. A device according to any preceding claim and adapted for use as a lap counter for toy cars running along a track, the device being provided with coupling means for attachment to the track, with the said operating member being formed by an arm extending in use into the path of toy cars running along the track.

10. A counting device for counting objects moving along a path past the device, comprising a spring driven rotary disc, an escapement mechanism including a member adapted for actuation by the successive passages of an object or objects along the path adjacent the device, to permit stepwise advance of the disc under the action of its driving spring, a driven member guided for movement radially of the disc and co-operating with spirally disposed guide means on the disc in such a manner that stepwise rotation of the disc is accompanied by stepwise advance of the driven member radially of the disc, and indicating means actuated in response to arrival of the driven member at a predetermined position of the driven member relative to the disc, to indicate completion of a predetermined number of stepwise movements from a given starting position of the disc.

11. A counting device substantially as herein described with reference to the accompanying drawings.

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**FIG. 3.**